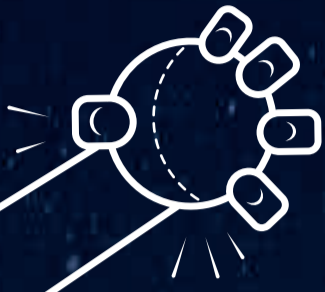


5 areas sleep has the greatest impact on athletic performance

IMPROVED REACTION TIMES



Elite athletes can't spare even fractions of a second to react to a play unfolding in front of them. Sleep deprivation is known to reduce reaction times significantly. Even a single all-nighter can reduce reaction times by more than 300%, not to

mention recovering takes several days. Studies have shown even a surprisingly low level of fatigue can impair reaction times as much, if not more, than being legally drunk.¹

It's surprising to hear that "being awake for 22 hours straight can slow your reaction time more than four drinks can".² Clearly, there are physiological differences between being intoxicated and being fatigued; however, if an athlete wouldn't reasonably expect to have peak reaction times after putting back four beers, they can't expect to perform their best on less than a full night's sleep either.

FEWER MENTAL ERRORS

Sleep loss impairs judgement. Studies have shown motivation, focus, memory, and learning to be impaired by shortened sleep. Without sleep, the brain struggles to consolidate memory and absorb new knowledge. "Past studies have shown that sleep loss impairs the frontal lobe of the brain and has negative effects on decision-making such as sensitivity to risk-taking, moral reasoning and inhibitions".¹

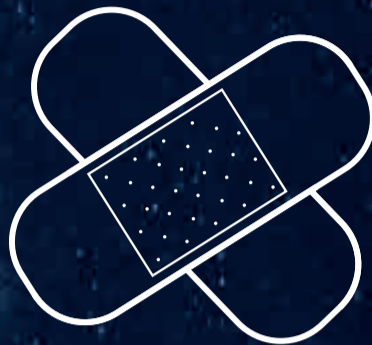
On the field, one study has shown that MLB players show decreased 'plate discipline' as the season progresses.² Meaning the number of times a batter swings at a ball outside of the strike-zone increases. While common logic would predict that plate discipline would improve over the season - as players had more practice and at-bats - the opposite was shown to be true. MLB players consistently showed better judgement at the beginning of the season than at the end. The suspected cause? Mental fatigue during an arduous 162 game season.

LONGER PLAYING CAREERS



Beyond acute injuries, one recent study on MLB players has shown fatigue can shorten the playing careers (and therefore income) of professional athletes. "We were shocked by how linear the relationship was," said the principal investigator W. Christopher Winter, MD, medical director of the Martha Jefferson Hospital Sleep Medicine Center in Charlottesville, Va. "It is a great reminder that sleepiness impairs performance. From a sports perspective, this is incredibly important. What this study shows is that we can use the science of sleep to predict sports performance".¹

REDUCED INJURY RATES & IMPROVED OVERALL HEALTH



A University of California study concluded that injury rates in youth athletes increased during games that followed a night of sleep fewer than 6 hours.¹ Another study looking at injury rates in high school athletes found that sleep hours was the strongest predictor of injuries, even more so than the hours of practice.²

Why is this the case? As we explored in the first point, fatigue affects reaction time. A tired athlete is slower to react to a potential hit on the ice, the field, or the court. Secondly, fatigue affects the body's immune system, making players more susceptible to illness. Thirdly, shorter sleep periods don't provide the body with sufficient time to regenerate cells and repair from the abuse of workouts, games, and daily activities. Over time, game-earned injuries, health issues, and the inability to fully recover can wear on an athlete and contribute to more time spent on the sidelines.

"If you told an athlete you had a treatment that would reduce the chemicals associated with stress, that would naturally increase human growth hormone, that enhances recovery rate, that improves performance, they would all do it. Sleep does all of those things."

BETTER ACCURACY & FASTER SPRINT TIMES



Sleep is crucial to the body's physiological, biochemical, and cognitive restoration. Cheri Mah, a researcher at Stanford, conducted a sleep-extension study with the university's men's basketball team. After maintaining a normal sleep schedule for 4 weeks to establish a baseline, players from the team went through a 7-week sleep extension period. Over this time, the players obtained as much nighttime sleep as possible, with 10 hours being the goal. The results:

"Measures of athletic performance specific to basketball were recorded after every practice including a timed sprint and shooting accuracy. Subjects demonstrated a faster timed sprint following sleep extension. Shooting accuracy improved, with free throw percentage increasing by 9% and 3-point field goal percentage increasing by 9.2%. Improvements in specific measures of basketball performance after sleep extension indicate that optimal sleep is likely beneficial in reaching peak athletic performance."

Similar performance improvements after sleep extension have been seen in tennis players, swimmers, weightlifters, and more.

* Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication - Williamson A, Feyer A. (2000)

‡ How awake are you? - Harvard Medical

† Sports-related injuries in youth athletes: is overscheduling a risk factor? - Luke A, et al. (2011)

¶ Chronic lack of sleep is associated with increased sports injuries in adolescent athletes - Milewski MD, et al. (2014)

• How sleep deprivation decays the mind and body - The Atlantic

Δ Studies link fatigue and sleep to Major League Baseball (MLB) performance and career longevity - Winter C. MD